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EXAMINATION OF COAL-DUST AFTER EXPLOSIONS IN MINES OF SOUTHEASTERN KANSAS.

By EDWARD BARTOW, University of Illinois, Urbana, Ill., read before the Academy
December 1, 1905.

WHILE investigating the effects of coal-mine explosions in the mines of southeastern Kansas, in February, 1905, I collected two specimens of coal-dust showing the effect of the heat of the explosion. This coal-dust was on the sides of the timbers towards the explosion, and evidently had been carried through the air by the force of the explosion. The intense heat had apparently partially melted the particles of dust, causing them to stick together and to adhere to the supports and to the sides of the mines near the spot where the explosion originated. The coating of dust was at least one-quarter of an inch thick. In this paper are shown comparative analyses of this dust and of the coal collected from the respective mines, in an endeavor to show the effect of intense heat of the explosion on the coal.

Specimen of dust No. 1 α was taken from the J. H. Bennett Coal Company's mine No. 1, two and one half-miles northwest of Weir City. In this mine an explosion occurred January 26, 1905. Two shot-firers lost their lives and the interior of the mine and the shaft were considerably damaged.

Specimen of dust No. 2 α was collected on February 24 from mine No. 1 of the Devlin & Miller Coal Company's mines, near Frontenac, six miles north of Pittsburg, Kan. In this mine two explosions occurred, on February 1 and 9, 1905, in which two shot-firers lost their lives. The interior workings of the mine were badly damaged, but, owing to the greater development, the explosion spent itself before reaching the shaft.

Specimen of coal No. 1 was collected from the J. H. Bennett Coal Company's mine No. 1 by Mr. James A. Orr, state mine inspector of Kansas. Specimen of coal No. 2 was taken by the writer from the Devlin & Miller Coal Company's mine No. 1, from the room in which the explosion of February 9 is supposed to have originated.

In the specimens of coal and dust thus obtained determinations of moisture, volatile and combustible matter, fixed carbon and ash are made according to the methods described in volume III of the University Geological Survey of Kansas, page 272.

For the sake of comparison of methods, we have added the results of a few analyses of Kansas coals from neighboring mines, made by Dr. W. R. Crane, and recorded on page 278 of volume III of the University Geological Survey of Kansas.

No.	NAME.	Moisture.	Volatile and combustible.	Fixed carbon.	Ash.
1	J. H. Bennett Coal Company No. 1, coal . . .	1.84%	40.55%	50.25%	7.36%
1a	J. H. Bennett Coal Company No. 1, dust . . . Coal from neighboring mines, Weir City, Kan.:	1.45	28.12	51.03	19.40
8	Kansas & Texas No. 18	3.57	36.96	51.84	7.63
9	Kansas & Texas No. 47	3.16	39.21	53.87	3.76
10	Durkee Coal Company No. 4	2.34	36.88	55.69	5.09
12	Hamilton & Braidwood No. 2	2.63	38.80	53.74	4.83
13	Central Coal Company No. 5	3.14	34.87	55.39	6.60
14	Durkee Coal Company No. 1	2.57	36.34	54.99	6.10
15	The Excelsior Coal Company	2.58	36.73	55.02	5.62
	Average of seven	2.857%	37.11%	54.70%	5.88%
2	Devlin & Miller mine No. 1, coal	1.79	39.13	53.41	5.67
2a	Devlin & Miller mine No. 1, dust Coal from a neighboring mine, Frontenac, Kan.	1.20	31.23	54.22	13.35
		3.06	35.92	54.89	6.13

In the results of our examination we would call attention especially to the decrease in the volatile and combustible matter and the increase in fixed carbon and ash.

The dust after the explosion is probably mingled with dust from the roof and floor of the mine or it would be the best index of the amount of coal consumed by the explosion. In the one case the ash increased 2.35 times, and in the other 2.54. While this comparison is not accurate, it would indicate that a considerable proportion of the finely divided carbon was oxidized in the explosion.

The decrease in the volatile and combustible material is also interesting, and we would mention the fact that the finely divided coal is browner in color than the finely divided dust, and, also, when placed on white paper, leaves a much more decided streak. Experiments with regard to the action of air on the finely divided dust are being carried on.